

REMARKS

Introduction

Applicants would like to thank the Examiner for reopening prosecution in light of the Pre-Appeal Brief Request for Review filed on December 7, 2010.

Claims 1-3, 5-21, and 23 are pending in the present application. In this Response, claim 1 has been amended. See, for example, page 6, lines 4-15 of the present specification. No new matter has been added.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of at least the above amendments and the following remarks.

Rejection under 35 U.S.C. § 112

Claims 1-3, 5-21, and 23 have been rejected under 35 U.S.C. 112, second paragraph as allegedly indefinite. In particular, it is the Examiner's position that in claim 1 the recitation that "wherein the fermentation liquor has been subjected to a temperature of at least 50°C" is allegedly "confusing and therefore indefinite because from the way it is written it is not exactly clear what it is that the applicant is trying to encompass with this limitation, specifically because the temperature of the liquor when subjected to the solids-liquid separation stage/system is not clear. Without conceding the propriety of the rejection and merely to expedite prosecution, independent claim 1 has been amended to replace "wherein the fermentation liquor has been subjected to a temperature of at least 50°C" with the method step of "subjecting the fermentation liquor to a temperature of at least 50°C". As the foregoing step is clear and unambiguous (see page 6, lines 4-15 of the present specification), the rejection of the claims under 35 U.S.C. 112, second paragraph, should be withdrawn.

Obviousness-type Double Patenting

Claims 1-3, 5-21, and 23 have been provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly unpatentable over claims 1, 9, and 12-20 of U.S. Patent 7,455,997 (hereinafter "the '997 patent"). Claims 1-3, 5-21, and 23 have been provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly unpatentable over claims 1, 2, 4-8, 17, and 19 of U.S. Patent 7,608,191 (hereinafter "the '191 patent").

Applicants believe that the present claims are patentable over the claims of the '997 patent and the '191 patent. However, to facilitate allowable subject matter, a terminal disclaimer over the '997 patent and the '191 patent will be submitted under separate cover, *as appropriate*, once allowable subject matter has been agreed upon.

It should be noted that the filing of a terminal disclaimer to obviate a rejection based on nonstatutory double patenting is not an admission of the propriety of the rejection. *Quad Environmental Technologies Corp. v. Union Sanitary District*, 946 F.2d 870, 20 USPQ2d 1392 (Fed. Cir. 1991).

Rejection under 35 U.S.C. § 103

Claims 1-3, 5-21, and 23 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over the '997 patent in view of U.S. Patent 7,566,469 (hereinafter "Scheimann") and U.S. Patent 6,132,625 (hereinafter "Moffett"). The rejection is respectfully traversed.

Legal Standard

Initially, it should be noted that the Office has the initial burden of establishing a factual basis to support the legal conclusion of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). For rejections under 35 U.S.C. § 103(a) based upon a combination of prior art elements, in *KSR Int'l v. Teleflex Inc.*, 127 S.Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007), the Supreme Court stated that a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006).

Pending Claims

Independent claim 1, from which rejected claims 2, 3, 5-21, and 23 directly or indirectly depend, recites a process of separating suspended solids from a fermentation liquor comprising the following sequence of steps: (i) producing the fermentation liquor in a fermentation process for the production of a fermentation product; (ii) subjecting the fermentation liquor to a temperature of at least 50°C; and (iii) subjecting the fermentation liquor to a solids-liquid separation stage, wherein the solids-liquid separation stage is assisted by a treatment system, and wherein the treatment system comprises an anionic polymer

selected from natural polymers and modified natural polymers having an anionic charge such that the equivalent weight is below 300, and synthetic polymers formed from at least 50% by weight anionic monomer units which anionic monomer units are selected from the group consisting of (meth) acrylic acids or salts, maleic acid or salts, itaconic acid or salts and fumaric acid or salts.

Cited Art

The '997 patent discusses a process of producing fermentation product comprising the steps of, (i) forming an acidified suspension of particulate plant derived material comprising a first polysaccharide which is more readily hydrolysable and a second polysaccharide which is more difficult to hydrolyse, (ii) allowing the first polysaccharide to undergo hydrolysis by action of an acid at a temperature of at least 50°C under conditions such that the first polysaccharide is hydrolysed and thereby forming an acidic mixture of an aqueous liquor containing dissolved sugar and a solid residue containing the second polysaccharide, (iii) subjecting the acidic mixture to one or more separation stages in which the solid residue and aqueous sugar liquor are substantially separated from each other, (iv) optionally washing the residue substantially free of acid and sugar, (v) adjusting the pH of the aqueous liquor to at least 4, (vi) passing the aqueous liquor from step (v) into a fermentation stage where the dissolved sugars are acted upon by a microorganism in a fermentation broth to produce a fermentation product, (vii) contacting the second polysaccharide by an enzyme, said enzyme hydrolyses the second polysaccharide to the component sugars, and allowing the component sugars to be acted upon by a microorganism in the fermentation broth to produce the fermentation product, (viii) separating the fermentation product from the broth, characterised in that the separation stage(s) in step (iii) is/are assisted by flocculation of the solid residue, employing one or more flocculating agent(s) selected from the group consisting of water-soluble polymers, water-swellable polymers and charged microparticulate material, wherein said one or more separation stages include a mechanical means selected from the group consisting of a filter press, centrifuge, belt press, horizontal belt filter, and pressure filter, and said solid residue includes cake solids. (See claim 1).

Scheimann is directed to a method of dewatering corn stillage solids comprising adding to the solids an effective coagulating and flocculating amount of an anionic copolymer comprising acrylic acid sodium salt, methacrylic acid sodium salt or 2-acrylamido-2-methyl-1-propanesulfonic acid sodium salt to form a mixture of water and

coagulated and flocculated solids; and separating the water from the coagulated and flocculated solids using a dewatering device. (Abstract).

Moffett is directed to a process of separating biosolids from an aqueous stream resulting from animal or vegetable processing operations using as flocculants an anionic inorganic colloid and a cationic polymer having a molecular weight greater than 1,000,000. (Col. 2, lines 7-15).

Differences between Pending Claims and Cited Art

The '997 patent is directed to a specific process of producing fermentation product. The '997's patent's process requires first (i) forming an acidified suspension of particulate plant derived material comprising a first polysaccharide and a second polysaccharide and then (ii) allowing the first polysaccharide to undergo hydrolysis by action of an acid at a temperature of at least 50°C under conditions such that the first polysaccharide is hydrolysed and thereby forming an acidic mixture of an aqueous liquor containing dissolved sugar and a solid residue containing the second polysaccharide. Then several steps later, the '997 patent requires (vi) passing the aqueous liquor from step (v) into a fermentation stage where the dissolved sugars are acted upon by a microorganism in a fermentation broth to produce a fermentation product, (vii) contacting the second polysaccharide by an enzyme, said enzyme hydrolyses the second polysaccharide to the component sugars, and allowing the component sugars to be acted upon by a microorganism in the fermentation broth to produce the fermentation product, (viii) separating the fermentation product from the broth.

Thus, in the '997 patent the step of heating at a temperature of at least 50°C occurs first and then several steps later the fermentation stage occurs. In particular, the '997 patent teaches that plant derived material is hydrolyzed at a temperature of at least 50°C and then several steps later a fermentation step occurs.

One of the significant differences between the '997 patent and the presently pending amended independent claim 1 is that unlike the '997 patent, amended independent claim 1 requires sequential steps (i)-(iii) in which fermentation occurs first, then subjecting the fermentation liquor to a temperature of at least 50°C, and then finally subjecting the fermentation liquor to a solids-liquid separation stage.

Accordingly, the '997 patent fails to disclose or suggest a process of separating suspended solids from a fermentation liquor comprising the following sequence of steps: (i) producing the fermentation liquor in a fermentation process for the production of a

fermentation product; (ii) subjecting the fermentation liquor to a temperature of at least 50°C; and (iii) subjecting the fermentation liquor to a solids-liquid separation stage, wherein the solids-liquid separation stage is assisted by a treatment system, and wherein the treatment system comprises an anionic polymer selected from natural polymers and modified natural polymers having an anionic charge such that the equivalent weight is below 300, and synthetic polymers formed from at least 50% by weight anionic monomer units which anionic monomer units are selected from the group consisting of (meth) acrylic acids or salts, maleic acid or salts, itaconic acid or salts and fumaric acid or salts, as presently recited in amended independent claim 1.

With at least the above in mind, if the Examiner selects to maintain his position, it is respectfully submitted that it is not appropriate to randomly pick and choose selective steps taught in the '997 patent to inaccurately show that the presently recited process steps are obvious. The entire process of the '997 patent must be considered and not just selective portions of the process. In this regard, the Examiner's attention is respectfully directed to M.P.E.P. § 2141.03, which provides that a prior art reference must be considered in its entirety, *i.e.*, as a whole, including portions that would lead away from the claimed invention.

W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

In view of at least the above, the '997 patent teaches a process that is very different from the presently recited process in amended independent claim 1.

With regard to Scheimann, it is the Examiner's position that "Scheimann teaches anionic polymer is formed using 20-60 percent by weight monomers...and adding ...anionic polymer to a fermentation liquor". (Office Action dated March 30, 2011, Page 9).

While Scheimann discusses the use of an anionic polymer in dewatering grain stillage solids, Scheimann still fails to cure at least the above-discussed deficiencies of the '997 patent.

Moffett fails to cure at least the above-discussed deficiencies of the '997 patent and Scheimann. Further, with regard to Moffett, it should be noted that a combination of anionic *inorganic* colloids are used in combination with organic polymers to clarify aqueous streams. (Col. 2, lines 7-15). In contrast, independent claim 1 recites an anionic *polymer* to assist in separating suspended solids from a fermentation liquor. There is no reason why one of skill in the art would substitute the presently recited anionic polymers with the anionic *inorganic*

colloids of Moffett.

Indeed none of the cited references disclose or suggest the presently recited process of separating suspended solids from a fermentation liquor.

In fact, it appears that the '997 patent, Scheimann, and Moffett have been combined using impermissible hindsight. In this regard, it should be noted that M.P.E.P. § 2142 sets forth that impermissible hindsight must be avoided.

Accordingly, in light of at least the above discussion, it is respectfully submitted that a *prima facie* case of obviousness has not been established against the pending claims based on the cited art.

Even if it were assumed *arguendo* that a *prima facie* case of obviousness has been established in view of the cited art, a *prima facie* case of obviousness can be rebutted by a showing of unexpected results. (See, for example, *In re Papesch*, 315 F.2d 381, 137 USPQ 43 (CCPA 1963)). In this regard, the cited references, alone or in combination, also fail to recognize the advantages resulting from the foregoing recited features. In particular, an advantage of the foregoing features is that the yield and/or efficiency of the present process can be improved by effecting a rapid but efficient solids-liquid separation of the solid residues from a fermentation liquor that has been subjected to elevated temperatures (*i.e.*, at least 50°C). (See, for example, page 6, lines 4-15 of the present specification). Additionally, the Examples of the present specification show that when the fermentation liquor is heated to 70°C, desirable characteristics such as better filterability and increased dewatering efficiency are achieved. (See, for example, pages 15-18 of the present specification).

In view of at least the above, the rejection over the cited references should be withdrawn.

Conclusion

The Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below if any issues remain in this matter, or if a discussion regarding any portion of the application is desired by the Examiner.

Respectfully submitted,
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